PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-149035
(43)Date of publication of application : 07.06.1996

(51)Int.Cl. H04B 1/38
G06K 17/00
G06K 19/07
H04B 7/26

(21)Application number : 06-308094
(22)Date of filing : 17.11.1994

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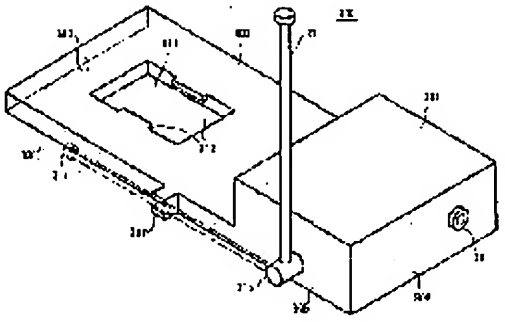
(54) CARD TYPE RADIO COMMUNICATION EQUIPMENT

(57)Abstract:

PURPOSE: To attain the transfer of information through a radio communication network by providing an input operating means and a display means of information together with the hard and soft interface means connected to an information terminal, an antenna and a radio transmitting/receiving circuit.



CONSTITUTION: A projecting part 301 is formed at one of both ends of a casing 300 of a communication card, and a communication circuit is built into this part 301. The other end part 302 of the casing 300 can be put into an extension slot of a portable information terminal PDA. A connector is provided on an end face 303 of the flat part 302, and an antenna 31 is attached onto the side face 303 of the part 302. The part 302 includes an opening 311 where a subscriber identification module SIM is loaded. Plural elastic contactors are provided on a printed wiring board included in the part 302 so that the electrical connection is secured between the module SIM and the printed wiring board.

LEGAL STATUS

[Date of request for examination]	07.03.2001
[Date of sending the examiner's decision of rejection]	23.04.2003
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	
[Date of registration]	
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	
[Date of extinction of right]	

* NOTICES *

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3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the suitable card mold radio communication equipment for the information terminal which cannot perform connection with a communication line.
[0002]
[Description of the Prior Art] Conventionally, as personal information machines and equipment, although the electronic notebook has spread, the Personal Digital Assistant equipment which developed from now on and which is called PDA (Personal Digital Assist) is also known.
[0003] This PDA is equipped with the keyboard and touch panel for an input and control, and, in addition to schedule management and the function of a telephone directory, has creation and the function of preservation of a message with a keyboard or a pen. Moreover, the thing in which data communication, such as facsimile, is possible is also made through the telephone line by carrying a modem function.
[0004] On the other hand, since a digital cellular phone system like for example, a GSM (Global System for Mobile communication) system is [the degree of freedom of a service space] expensive, the use in business etc. has been expanded. It connects with a nearby base station through the wireless circuit of a UHF band, and comparatively wide range migration is possible for such a cellular phone. And in a cellular phone, digital processing is carried out, and a sound signal has a time-axis and the amount of data compressed, and is transmitted.
[0005] First, the Personal Digital Assistant and cellular-phone system by which this invention is applied are explained, referring to drawing 8 - drawing 10 .
[0006] As shown in drawing 8 , while between base station 1a installed in an area different, respectively and 1b is connected through the base station link 2, in a cellular-phone system, the general dial office 3 is connected through this link 2 so that cross connection may be possible.
[0007] 10a, 10b, and 10p are the above PDA, a modem function is carried, respectively and PDA10p is connected to a dial office 3 through the cable link 4. Moreover, 30a and 30b are cellular phones, and while connection is made possible through radio links 5a and 5b in base stations 1a and 1b, respectively, PDA 10a and 10b is connected through the modem links 6a and 6b, respectively. Furthermore, connection of the mounted terminal 7 and base station 1b is enabled through 5m of radio links.
[0008] And it is constituted as an IC card which 39a and 39b are authentication modules (it calls for short Subscriber Identify Module and Following SIM) delivered to each subscriber of a GSM system, and contains CPU, and contract situations, personal identification numbers (Personal Identify Number), etc., such as a network which a subscriber can use, are memorized. Moreover, by this authentication module, communicative encryption and a communicative telephone directory function are offered.
[0009] If a subscriber inserts SIM39a in the terminal of a GSM system, for example, cellular-phone 30a, and inputs a personal identification number, a personal identification number will be verified within SIM39a. When using another GSM terminal on the way etc., the terminal performs location updating to a base station according to the contents of inserted SIM.

[0010] As shown in drawing 9 , PDA10 can choose the menu which it is equipped with a touch panel 12 in piles, and is displayed on this display 11 by a handwriting input and the display 11 as a man machine interface while being equipped with a liquid crystal display 11. Moreover, the input by the keyboard 13 is also possible.
[0011] And in a format like an address book, while being able to register a personal name, the address, the telephone number, etc., this can be displayed on a display 11 and a phase hand's telephone number can also usually be searched with PDA10.
[0012] As shown in drawing 9 , the data-processing system 20 of PDA10 is constituted including ROM22 and RAM23 in which processing programs, such as the fundamental program (Operating System), were stored, and is connected with CPU21 through a bus 25 with the timer 24 for time management. In this example, while some fields of RAM23 are made a non-volatile by backup of a cell and data, such as a user's above schedules and a telephone directory, are memorized to this non-volatile field, the field of that complementary of RAM23 is used as a work area.
[0013] While a liquid crystal display 11 is connected to it through an interface 27 while a touch panel 12 and a keyboard 13 are connected to a bus 25 through an interface (I/F) 26, and the data input and control by handwriting or the key stroke are made, the result of the data processed by CPU21 is displayed on a display 11.
[0014] Moreover, the PCMCIA interface 28 is connected to a bus 25, and the function of PDA10 can be extended by inserting in a predetermined slot the IC card with which the application of memory or arbitration was carried. Incidentally, "PCMCIA (Personal Computer Memory Card InternationalAssociation)" is the specification of the IC card used for a personal computer etc., the pin assignment for fundamental connection, a signal line, control instruction, etc. are defined, and what [its] was adopted by PDA has increased.
[0015] In addition, since the modem function is not carried in this PDA10 so that clearly from drawing 9 , it is not directly connectable with the telephone line.
[0016] As shown in drawing 10 , a cellular phone 30 is equipped with the wireless transceiver circuit 40, the receiving signal-processing system 50 and the sending-signal processor 60, and a control system 70 while it is equipped with the actuation key 34 and liquid crystal displays 35, such as the antenna 31 for wireless transmission and reception, an earphone (loudspeaker) 32 and a telephone transmitter (microphone) 33, and a dialing key.
[0017] Through the RF amplifier 41 of the transceiver circuit 40, a mixing circuit 42 is supplied, it is mixed with the output of PLL43, and the input signal from an antenna 31 is changed into an intermediate frequency (IF) signal. In addition, the control signal for a channel setup with the inside of a 935-960MHz receiving band and a 890-915MHz transmitting band is supplied to PLL43 from a control system 70. Although each IF signal from a mixing circuit 42 omits illustration, a detector circuit is supplied through an amplifier, for example, rectangular detection is carried out, and it is changed into baseband.
[0018] In the wireless transceiver circuit 40, the signal changed into baseband is supplied to the data demodulator circuit (DEM) 52 through A-D converter 51 of the receiving signal-processing system 50. Data and voice are multiplexed and the output of this demodulator circuit 52 is supplied to the voice decoder (VC-DEC) 53 and a data decoder (DT-DEC) 54 in common.
[0019] In the voice decoder 53, voice transform processing is performed and the output is supplied to a loudspeaker 32 through D-A converter 55. Moreover, in a data decoder 54, decode processing is performed to data, and while the output is supplied to a control system 70 and processed by CPU71, the data to a user etc. are displayed on a display 35.
[0020] On the other hand, while the sound signal from a microphone 33 is supplied and voice-data-ized by the voice encoder (VC-ENC) 62 through A-D converter 61 of the sending-signal processor 60 and is supplied to the data modulation circuit (MOD) 63 The data from a control system 70 lead the data encoder (DT-ENC) 64. The data modulation circuit 63 is supplied, and through D-A converter 65, the baseband digital signal of this data modulation circuit 63 is changed into a baseband analog signal, and is supplied to the wireless transceiver circuit 40.

[0021] In the wireless transceiver circuit 40, a baseband analog signal is suitably changed into the carrier signal of a frequency by quadrature modulation in the modulation circuit which omitted illustration. A mixing circuit 44 is supplied, it is mixed with the output of PLL43, and this carrier signal is changed into the RF signal of a predetermined channel, and is emitted from an antenna 31 through an output amplifier 45.
[0022] A control system 70 is constituted including RAM73 as a work area, and is connected with CPU71 and ROM72 in which the processing program was stored through a bus 75 with the timer 74 for time management.
[0023] In this example, some fields of RAM73 are made a non-volatile by backup of a cell, and while the data which the user set as this non-volatile field are memorized, the field of that complementary of RAM73 is used as a work area.
[0024] While a keyboard 34 and a liquid crystal display 35 are connected to a bus 75 through an interface 76 and the data input and control by the key stroke are made, the result of the data processed by CPU71 is displayed on a display 35. Moreover, SIM39 is connected to a bus 75 when a cellular phone is the digital cellular phon of a GSM method, while PDA10 is connected through an interface 77.
[0025]
[Problem(s) to be Solved by the Invention] By the way, since the modem function is not carried in PDA10 as shown in the pre- release of drawing 9 , it is not directly connectable with the telephone line. Moreover, like PDA10p shown in the pre- release of drawing 8 , even if the modem function is carried, when connecting by cable link 4p, a service space is restrained and it is not user-friendly.
[0026] On the other hand, as shown in the pre- release of drawing 8 , by connecting to cellular phones 30a and 30b PDA 10a and 10b in which the modem function is carried respectively through the modem links 6a and 6b, a network data circuit can be used through radio links 5a and 5b etc., data transfer becomes possible, and the above faults are canceled.
[0027] Moreover, although the part in connection with a man machine interface is inadequate if it sees from the field of data transfer in order for the cellular phone itself to make a voice message a key objective, the fault of a man machine interface is also canceled by using PDA together.
[0028] However, since two or more systems exist in a cellular phone, even if it builds the communication device corresponding to a specific system in PDA, the constraint on use will increase by the difference in a service area etc. Moreover, the problem that it is necessary for the structure of PDA to add modification arises.
[0029] It is in the place which offers the card mold radio communication equipment which can add the data communication facility by wireless, without adding any modification to the information terminal which the purpose of this invention cannot connect with a communication line in view of this point.
[0030]
[Means for Solving the Problem] In order to solve said technical problem, the card mold radio communication equipment by this invention If the reference mark of the below-mentioned example is made to correspond, it will have the informational alter operation means 12 and 13 and the informational display means 11. It is card mold radio-communication-equipment 30C which is not equipped with the connecting means with a communication line and which was formed in the predetermined expansion slot 102 of the information terminal 10 possible [insertion]. And an interface means with an information terminal, It has an antenna 31 and the wireless transceiver circuit 40, and can be made to perform transfer of the information on an information terminal through a predetermined radio network.
[0031]
[Function] According to this configuration, transfer of the information on the exterior of the information terminal which cannot perform connection with a communication line is enabled through the radio network corresponding to the subscriber authentication module with which the radio communication equipment inserted in the expansion slot was equipped, without changing itself in any way.
[0032]
[Example] Hereafter, one example of the card mold radio communication equipment by this invention is explained, referring to drawing 1 - drawing 7 .

[0033] First, the mechanical configuration of one example of this invention is shown in drawing 1 and drawing 2 . 300 is the case of a communication link card, and in drawing 1 , while the edge 301 of one of these is formed in convex and the in general same communication circuit (post- release-of-drawing 3 reference) as the above-mentioned cellular phone is built in, the other end 302 of a case 300 is formed in plate-like, and as shown in drawing 2 , it can be inserted in the expansion slot 102 of the case side face 101 of PDA10. And the connector 304 of PCMCIA conformity is arranged in the end face 303 of the plate-like section 302.
[0034] An antenna 31 is attached in the side face 305 of the height 301 of the case 300 of a communication link card. When base 31b of an antenna 31 consists of this example free [rotation] and an antenna 31 is used, the elasticity of a spring (illustration is omitted) considers as a standing-up condition perpendicular to the plate-like section 302 of a case 300, as a continuous line shows. Moreover, when an antenna 31 is not used, as a broken line shows to drawing 1 , it engages with the antenna attaching part 307 formed in the side edge 306 of the longitudinal direction of a case 300, and considers as a lodging condition parallel to a side edge 306.
[0035] As shown in drawing 2 , even if it is going to insert the plate-like section 302 of the case of a communication link card in the expansion slot 102 of the case side face 101 of PDA in the state of this lodging, 31t of tips of an antenna 31 cannot contact the case side face 101 of PDA, and it cannot insert in an expansion slot 102.
[0036] Moreover, the jack 36 for connecting the earphone microphone for I/O of a sound signal (illustration being omitted) to the end face 308 of the height 301 of a case 300 is formed.
[0037] And in this example, the opening 311 for equipping the plate-like section 302 of a case 300 with SIM39 is formed. This opening 311 is slightly formed greatly from SIM39, and one pair of overhang sections (tab) 312 are formed in that longer edge.
[0038] As shown in drawing 2 , while two or more elastic contact segments 314 are formed in the printed circuit board 313 in the plate-like section 302 of a case 300 and SIM39 and a printed circuit board 313 are electrically connected to it by this contact segment 314, it is supported so that SIM39 may contact a tab 312.
[0039] Moreover, in this example, when communication link card 30C is inserted in the expansion slot 102 of the case side face 101 of PDA10, the location of opening 311 is set up, during employment of communication link card 30C, SIM39 was omitted accidentally or ****** to damage is prevented so that the whole may be concealed in this slot 102.
[0040] Next, the electric configuration of one example of this invention is shown in drawing 3 . In this drawing 3 , the same sign is given to the part corresponding to the pre- release of drawing 10 , and duplication explanation is omitted.
[0041] drawing 3 -- setting -- the above -- while replacing with the conventional loudspeaker and conventional microphone of a cellular phone 30 as looked like [drawing 10] and shown, forming the jack 36 for connecting an external earphone microphone (illustration being omitted) for a voice input/output and connecting the output side of amplifier 55 to 36s of terminals of one of these, the input side of amplifier 61 is connected to 36m of other-end children.
[0042] Moreover, since communication link card 30C of this example is premised on connecting with above PDA10 and operating, it is not equipped with the keyboard and display which are a man machine interface, and I/F for it. Furthermore, as mentioned above, since communication link card 30C is equipped with SIM39, it is not necessary to add any modification to the PDA10 side in this example. The configuration of the complementary is the same as the pre- release of drawing 10 .
[0043] If above communication link card 30C is directly inserted in the expansion slot 102 of PDA10, as shown in the pre- release of drawing 8 , like PDA10a and cellular-phone 30a which were connected by modem link 6a, through radio-link 5a, a network data circuit can be used and data communication with terminals, such as other cellular phones, will become possible.
[0044] Moreover, since the interface of software is carried, it is not necessary to add any modification to the PDA side, and can respond to communication link card 30C hard and by exchanging the interface of software also at PDA with PDA10 from which OS differs.

[0045] Next, start-up processing (housekeeping operation) of one example of this invention is explained, also referring to drawing 4 .
[0046] When equipping the expansion slot of PDA10 with communication link card 30C as shown in drawing 1 and operating it, the interface which connects by software OS carried in PDA10 and the program for a communication link carried in communication link card 30C, and the so-called driver are required, and the driver corresponding to OS by the side of PDA is stored in ROM72 by the side of card 30C with the program for a communication link in this example.
[0047] If communication link card 30C is inserted in the expansion slot of PDA10 and a power source is switched on, first, in step 201, CPU21 of PDA10 will recognize having been equipped with communication link card 30C of PCMCIA conformity, and will read the above communications programs etc. from communication link card 30C.
[0048] At the following step 202, location update is performed through a radio link to the base station of GSM as shown in the pre- release of drawing 8 according to the contents of SIM39 with which communication link card 30C was equipped. Thereby, the whereabouts of specific SIM39 is registered into a base station, and preparation of communication link initiation is completed.
[0049] And if a personal identification number input request is displayed on the display of PDA (step 203) and the personal identification number input by the user is inputted into waiting (step 204) and a personal identification number, it will progress to step 205 and it will be confirmed whether be a right personal identification number. In a right case, the inputted personal identification number progresses to step 206, the display which can communicate on the display of PDA is made, and start-up processing is completed.
[0050] On the other hand, when it is judged at step 205 that the inputted personal identification number is not right, it will shift to step 207, it is confirmed whether the input of a personal identification number is a consecutive three-time error, if it is not a consecutive three-time error, it will return to step 202 and the above processings will be repeated.
[0051] When the input of a personal identification number becomes an error continuously 3 times, while progressing to step 208 and closing SIM39, that is displayed on the display of PDA and start-up processing is completed. When SIM39 is closed, it becomes impossible in addition, to receive any services through a GSM network since then.
[0052] Next, data communication processing of one example of this invention is explained, also referring to drawing 5 . After start-up processing of drawing 4 is completed as mentioned above, data communication processing is started.
[0053] First, in step 211, a communications program like FAX communicating software is started, if it will be in the condition of the waiting for a data input by the user (step 212) and data are inputted, it will progress to step 213,114 and the telephone directory by the side of PDA and the telephone directory by the side of SIM39 will be searched.
[0054] It is confirmed at the following step 215 whether these retrieval was successful. In a retrieval success It progresses to step 216, and the contents of retrieval containing the telephone number are displayed on the display of PDA, and will be in the condition of the selection wait operation by the user (step 217). With an input or a touch pen of an index number etc. If the specific telephone number is chosen, input data will be transmitted to the other party progressed and chosen as step 218, and data communication processing will be completed.
[0055] On the other hand, at step 215, if it shifts to step 221, and the non-result of retrieval is displayed on the display of PDA, and will be in the condition of the waiting for the telephone number input in a manual (step 222) and the telephone number is inputted when retrieval is not successful, it will progress to step 218, input data will be transmitted, and it will end. Moreover, when there is no input of the telephone number into predetermined time, it remains as it is and ends.
[0056] In this example, input-screen 11T as shown in drawing 6 , or output screen 11R as shown in drawing 7 is displayed on the display 11 of PDA10 in above-mentioned data communication processing according to a user's selection.
[0057] Two or more blocks 111-115 and two or more control function fields 120-125 are set as input-

screen 11T of drawing 6 , and two or more control function fields 120,126-129 are set as them by output screen 11R of drawing 7 with the block 117,118. Moreover, each block 111 to 115; 117,118 is adjoined, respectively, and the actuation field 131 to 135; 137,138 for indicating the marginal contents by scrolling is arranged.

[0058] These blocks, a control function field, and an actuation field can be chosen, respectively with the touch panel 12 with which the display 11 is equipped in piles, or a keyboard 13.

[0059] The destination column 111, the reference distribution column 112, the addresser column 113, the header column 114, and this column 115 are chosen one by one by touch actuation of a user etc. on input-screen 11T of drawing 6 .

[0060] Three places of "the phase hand who wants to distribute data etc., for example, "Alpha", Bravo", and "Charlie" are entered in the first destination column 111, and "the phase hand who needs to tell existence of data etc., for example, "Delta", and Echo" are entered in the following reference distribution column 112. When the above-mentioned destination column 111 or the above-mentioned reference distribution column 112 is chosen, the "D List" field 125 becomes usable and the result of the above-mentioned telephone directory retrieval is displayed on a part of input-screen 11T as a sub menu 116 by touching the this "D List" field 125. And when a user chooses the index number of a sub menu 116, or the telephone number, the desired telephone number is entered in the destination column 111 or the reference distribution column 112.

[0061] On the other hand, in a telephone number input with a manual, when the destination column 111 or the reference distribution column 112 is chosen, cursor is displayed in the column, it was inputted from the keyboard 13 of PDA10, for example, the telephone number of "xxxx xxxx [ ]" is displayed on the reference distribution column 112 like illustration.

[0062] Although an addresser, for example, "Foxtrot", is entered in the following addresser column 113, it is at the selection time of input-screen 11T, and the PDA owner name set up beforehand can also be filled in automatically.

[0063] And the header of the text etc. is entered in the header column 114, and a keyboard or the text by handwriting is written down in this column 115 at it. When it links the data currently separately prepared after this text, the "Data" field 121 of a touch panel 12 is touched, and a data link is performed by choosing the data file displayed. Moreover, when it links voice data, it is similarly carried out by touching the "Voice" field 121.

[0064] Input-screen 11T are initialized by touching the "Clear" field 123 to cancel all the inputted contents. When it is checked that there is no error in all the contents of an input, and input data is transmitted to a network side, data communication processing is completed and it returns from input-screen 11T to the screen of the usual PDA by touching the "Send" field 124, all actuation is completed by touching the "Quit" field 120.

[0065] When output screen 11R of drawing 7 is chosen by the user and data are received, while a reception list like illustration is displayed on the addresser column 117 of this output screen 11R on the other hand, the addresser chosen by the cursor shown by ">>", for example, the data based on the FAX communication link from "Foxtrot", is displayed in this column 118 like illustration.

[0066] Moreover, a header is displayed in the addresser column 117 by touching the "Ind." field 126 to see the data file received. Furthermore, during the list of addresser columns 117, by touching a field 127 or the "Next" "Prev" field 128, cursor moves up and down within the addresser column 117, for example, the received data from "Killo" and "Juliet" are displayed in this column 118 to see other received data.

[0067] In addition, when the printer is connected to PDA10, contents on display in this column 118 are printed by touching the "Print" field 129. And when returning from this output screen 11R to the screen of the usual PDA, all actuation is completed by touching the "Quit" field 120 like ****.

[0068] Although the above-mentioned example explained the case where a digital cellular phone system was a GSM method, it can respond also to digital telephone methods other than a GSM method like for example, a PDC (Personal Digital Cellular) method or the North America method by changing the hardware and the communications protocol of communication link card 30C.

[0069]
[Effect of the Invention] So that it can insert in the predetermined expansion slot of the information terminal which is equipped with an informational alter operation means and an informational display means, and is not equipped with the connect function with a communication line according to this invention, as explained above A card mold radio communication equipment is formed. By [with an information terminal] carrying hard and the interface means of software, and an antenna and a wireless transceiver circuit While enabling transfer of the information which leads a radio network, without adding any modification to the information terminal itself, the card mold radio communication equipment with which the man machine interface was communalized and cost was reduced is obtained.
[0070] Moreover, when a radio network needs a predetermined subscriber authentication module, the omission and breakage of an authentication module under employment are prevented by preparing it in a location which is concealed partially at least, when the authentication module applied part for equipping with this authentication module is inserted in an expansion slot.

[Translation done.]

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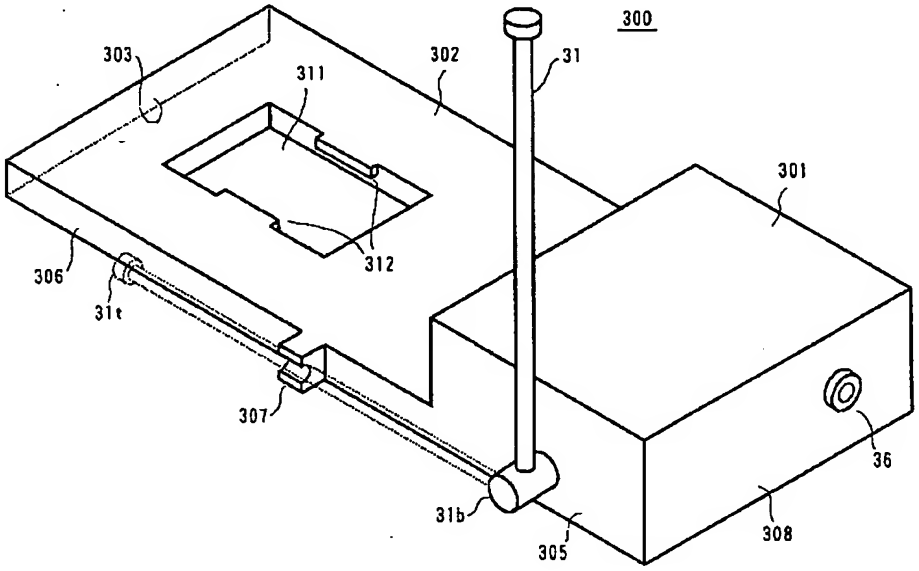
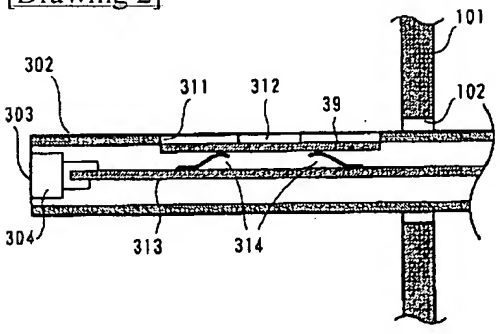
DRAWINGS

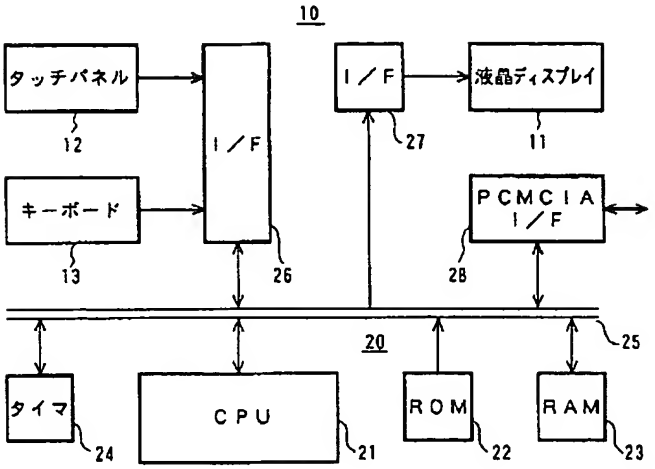
[Drawing 1]



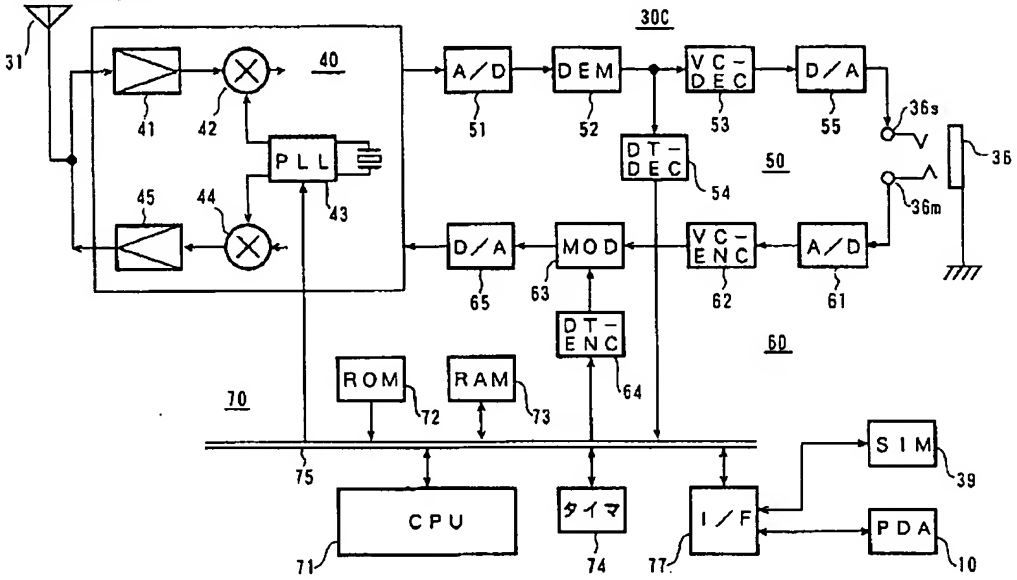
[Drawing 2]



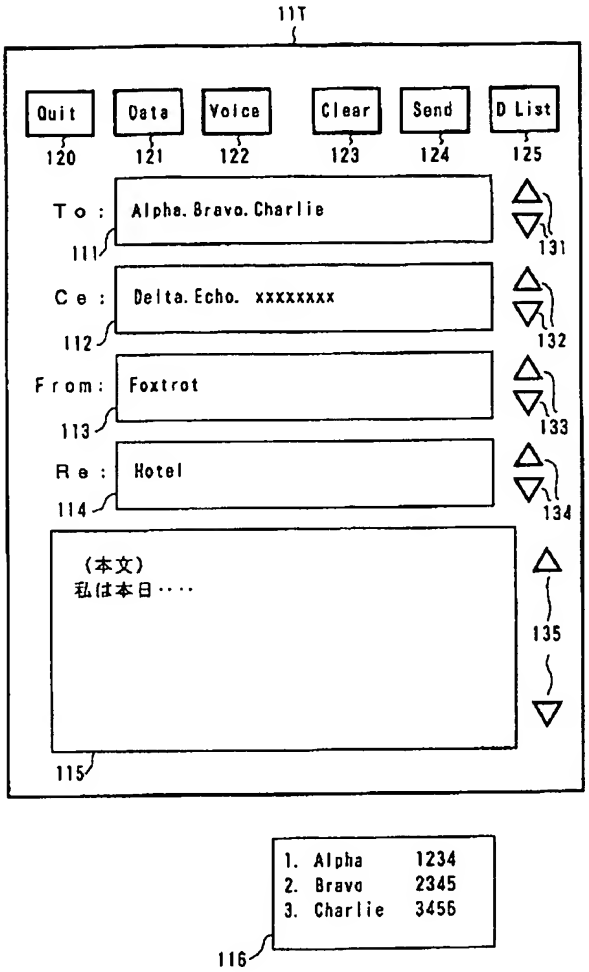
[Drawing 9]



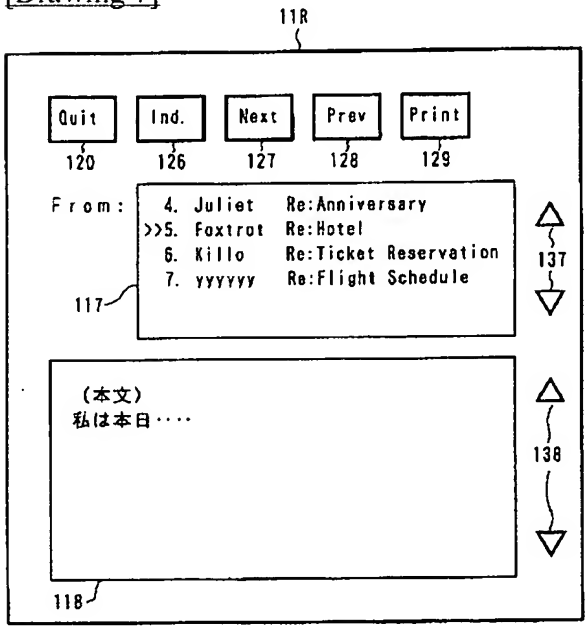
[Drawing 3]



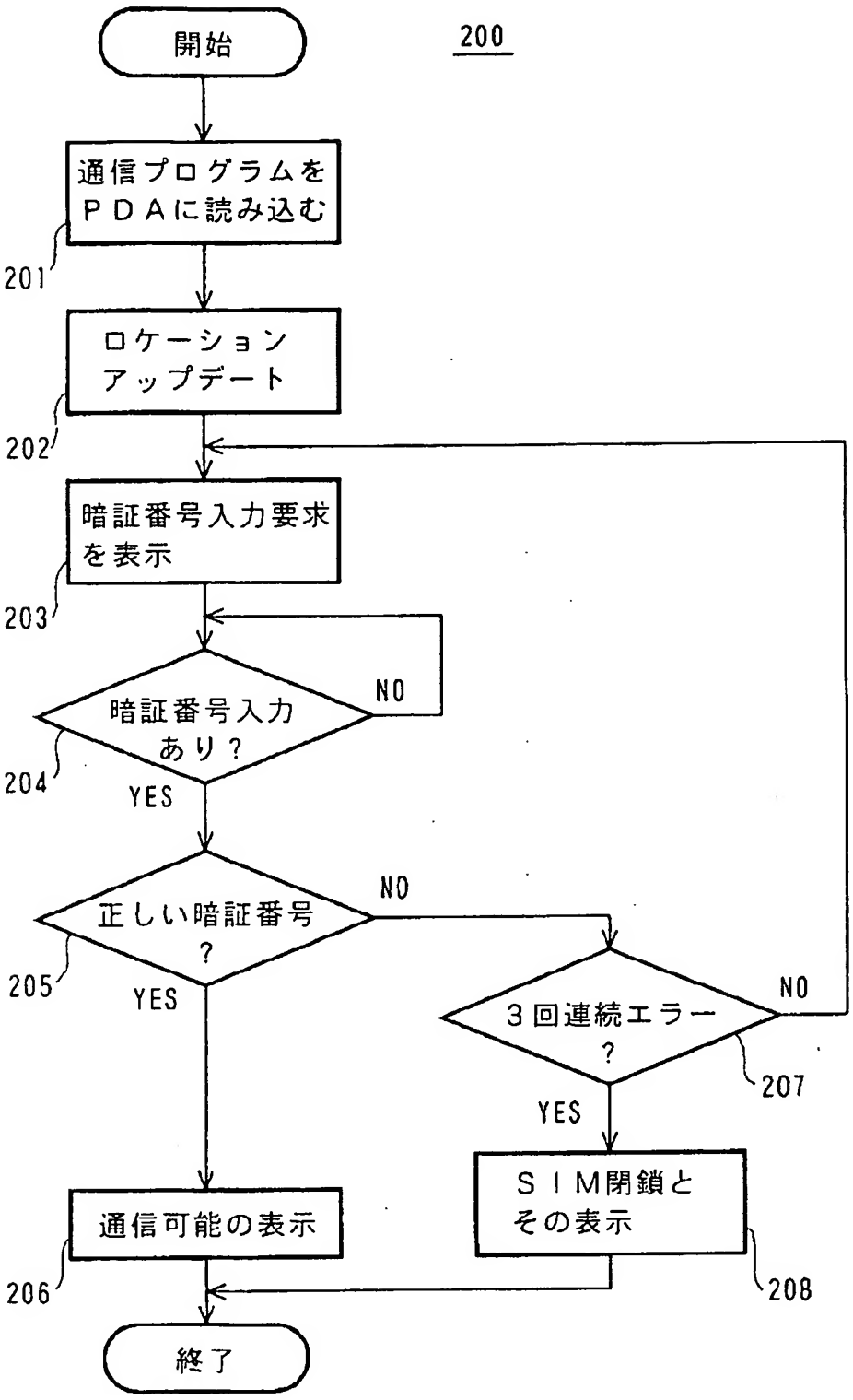
[Drawing 6]



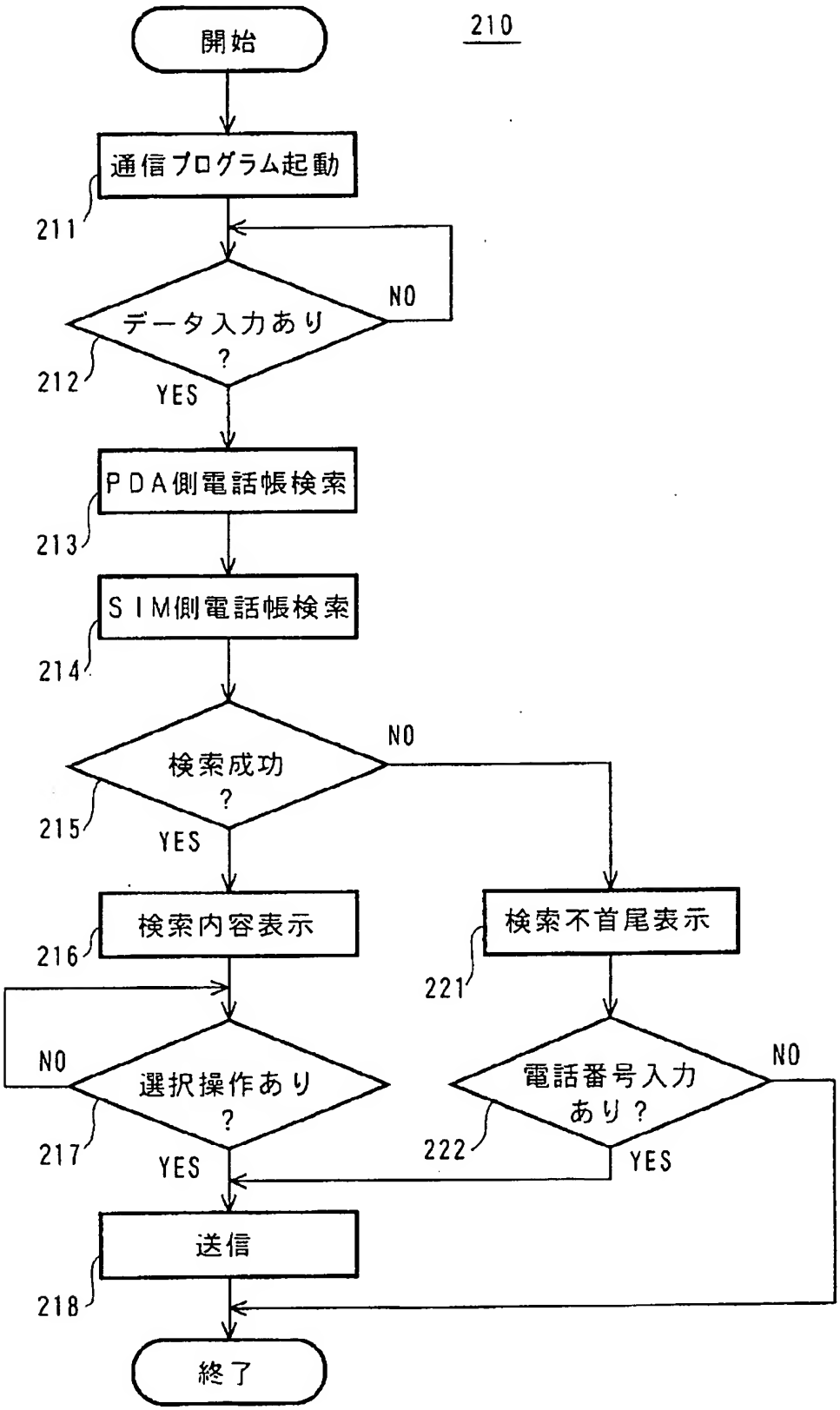
[Drawing 7]



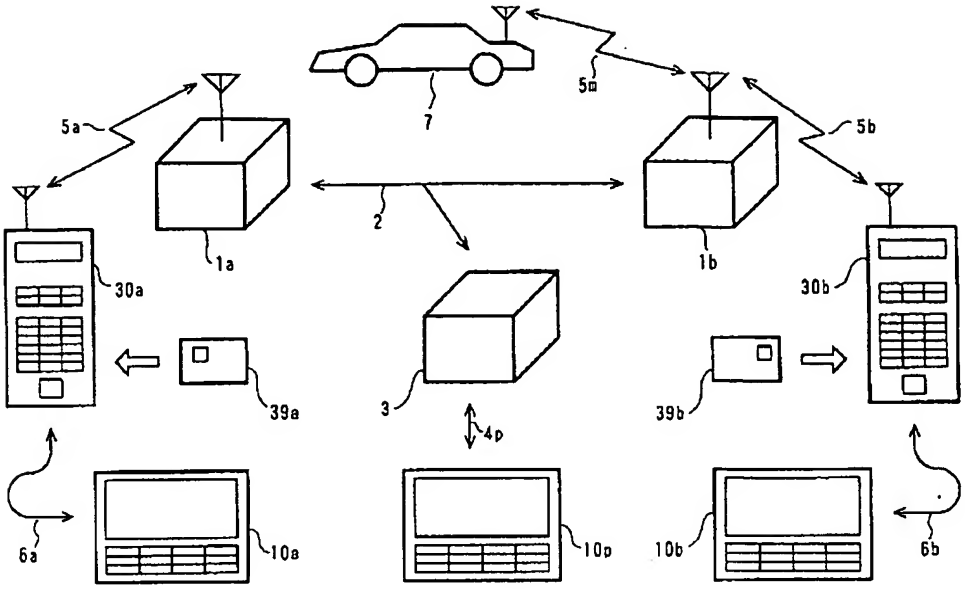
[Drawing 4]


200
開始
通信プログラムを
ＰＤＡに読み込む
201
ロケーション
アップデート
202
暗証番号入力要求
を表示
203
暗証番号入力
あり？
NO
204
YES
正しい暗証番号
？
NO
205
YES
３回連続エラー
？
NO
207
YES
ＳＩＭ閉鎖と
その表示
208
通信可能の表示
206
終了

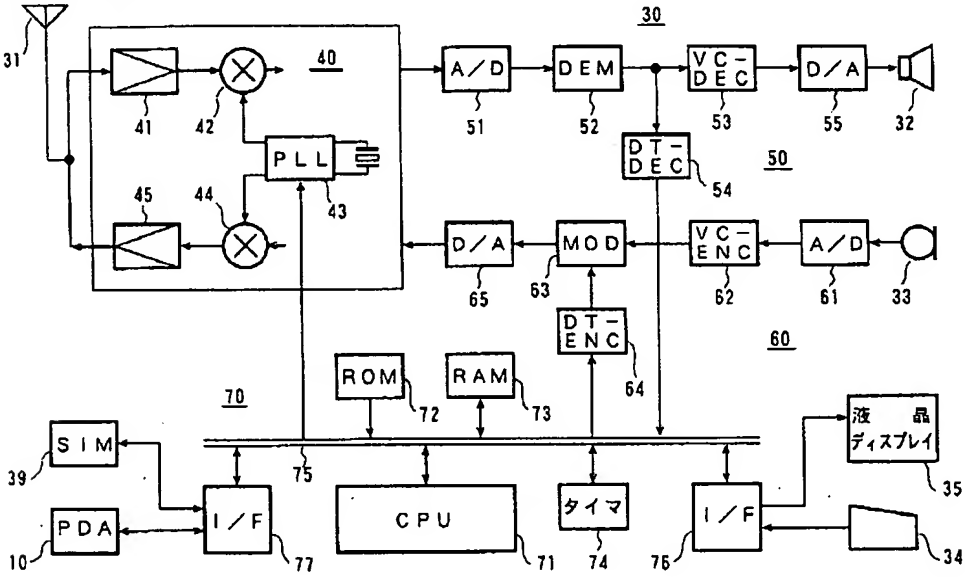
[Drawing 5]


210
開始
通信プログラム起動
211
データ入力あり？
NO
212
YES
PDA側電話帳検索
213
SIM側電話帳検索
214
検索成功？
NO
215
YES
検索内容表示
216
検索不首尾表示
221
NO
選択操作あり？
217
YES
電話番号入力あり？
NO
222
YES
送信
218
終了

[Drawing 8]



[Drawing 10]



[Translation done.]